CHAPTER 1. Scope

1.1 Identification

This document describes software requirements for the Defense Information Infrastructure (DII) Common Operating Environment (COE) common support applications services: Alert Services, Track Correlation Management Services, Joint Mapping Tool Kit (JMTK) Services, Message Processing Services, Office Automation Services, and On-Line Support Services.

1.2 System Overview

The DII COE is intended for use by all Department of Defense Command and Control Systems as the infrastructure on which they reside. The COE consists of an integrated architecture made up of hardware and software which provides standard, modular, system support and application support software for a tailorable set of functional application software.

This document specifies the software requirements for the DII COE.

Service and agency unique requirements are outside the scope of this document.

The requirements in this document apply to software developed for the DII, contributed to the DII, or licensed for use within the DII. This document applies to software within the DII COE, Common Support Applications, and service-specific or mission-specific applications.

1.2.1 Alert Services System Overview

Alert Services functional area provides generic mechanisms for alerting a process. When a process has determined that a predefined criteria or event has occurred for notifying other processes, that process shall use the Alert Services software to notify all interested processes of the event. Alert Services software is composed of an Alerts Server mechanism and a generic Alerts Display mechanism. The Alerts Server allows processes to register to create and receive alerts. The server distributes Alerts using the COE communications support and ensures that Alerts are delivered when issued. The Alerts server supports the requests of client applications and the generic display tool. The Alerts Display tool is a generic display tool for viewing Alerts. The tool is not intended to be the primary means of displaying the Alerts. It is a generic means of displaying alerts more for diagnostics than general use. The Application Programming Interfaces (APIs) provide for access to all display and server functionality.

1.2.2 Track Correlation Management Services System Overview

The Track Correlation Management Service is a COE Common Support Layer module. It is designed to provide both an automated and an interactive type of data management service known as correlation. Correlation is technically defined as the process of taking a new input (called a contact), comparing it to a database of previous inputs (called tracks), and deciding whether the new input is updated/revised information about an existing track or is a new, previously unreported input that should be added as a new record in the database. In this context, correlation includes front-end data conditioning, correlation, submission of new records for insertion, and combination of new inputs with existing database records to produce a new resulting record. In addition, user interaction with the data for analysis and maintenance is provided.

Correlation is not exclusively the domain of intelligence. Correlation is intended to be used by any process or mission application that maintains a resolved set of data that should be updated by new inputs. A non-intelligence example would be maintenance of a database of Global Positioning Satellite (GPS) transponder positions, updated in a dynamic fashion. Correlation of data from cooperative sources - ones that

fully and uniquely identify the entities being tracked (like GPS) - could commonly be called "filing". Correlation of data from non-cooperative sources - such as enemy tracking reports - requires a more advanced approach, involving computational algorithms to process content within inputs as part of a decision making process.

Correlation is the first step of a larger process classically called data fusion, with the other steps being situational analysis, threat analysis, and processing refinement [JDL Data Fusion Model]. The intent of the Track Correlation Management Service is to provide automated support for correlation only; the requirements for the remaining levels of data fusion vary widely between the military services and should remain (at least for now) as mission applications.

Correlation is not the same as "common picture" or "battlefield visualization". It does share databases with those services, and it provides mechanisms for enforcing a common picture and permitting distributed contact data management across a theatre of operations. Ultimately, the Track Correlation Management Service provides a function that produces the "correlated" data set which can be used/viewed by its own display, manipulation, and data management services, or by any other COE segment/mission application desiring to use such data.

The following terms are employed throughout this document, working definitions are provided for completeness and for reference

ENTITY
a uniquely identified object (a unit, a piece of equipment, a person, a facility, a manmade feature, or a natural feature) that exists.

IDENTITY of an ENTITY
an attribute or a set of attributes that allow an entity to be uniquely specified and distinguished from other entities.

CONTACT
an observation of one or more attributes of an entity (whose identity may not have been among the contact's attributes).

TRACK
a set of contacts. A track inherits estimated attributes from the attributes of its constituent contacts. Contacts with the set may exhibit variable attribute values. This document discusses a two tiered track structure - high level tracks that represent sets of contact reports that are assessed to correspond to a single entity, and low level, or reporting domain tracks, that share common parametric or attribute data. Low level tracks typically derive from a common reporting source and are often subject to domain specific correlation processing. It is always the case that a high level track may consist of the union of low level tracks that nonetheless retain their individual identities.

CORRELATION
the process of deciding whether a contact either belongs to an existing track or represents a new track (or may be ambiguous given available information).

CORRELATOR
the implementation of a correlation decision and the resulting database actions, either inserting a new record or updating an existing record.

ASSOCIATION
the process of linking an entity and a track; the determination of the identity of a track (Editor's Note: This definition is not in concert with the definition of association held in the JDL DFM and classic data fusion texts which use the term assignment for the process of linking an entity and a track).

It is recognized that these definitions [except where noted] are similar to but not exactly the same as in the JDL Data Fusion Lexicon. The intent was to develop a working set of terms to provide a common reference for software system developers from all services; these definitions represent a consolidated proposal from the major service tactical intelligence system developers.

The following figure provides an illustration of these concepts.

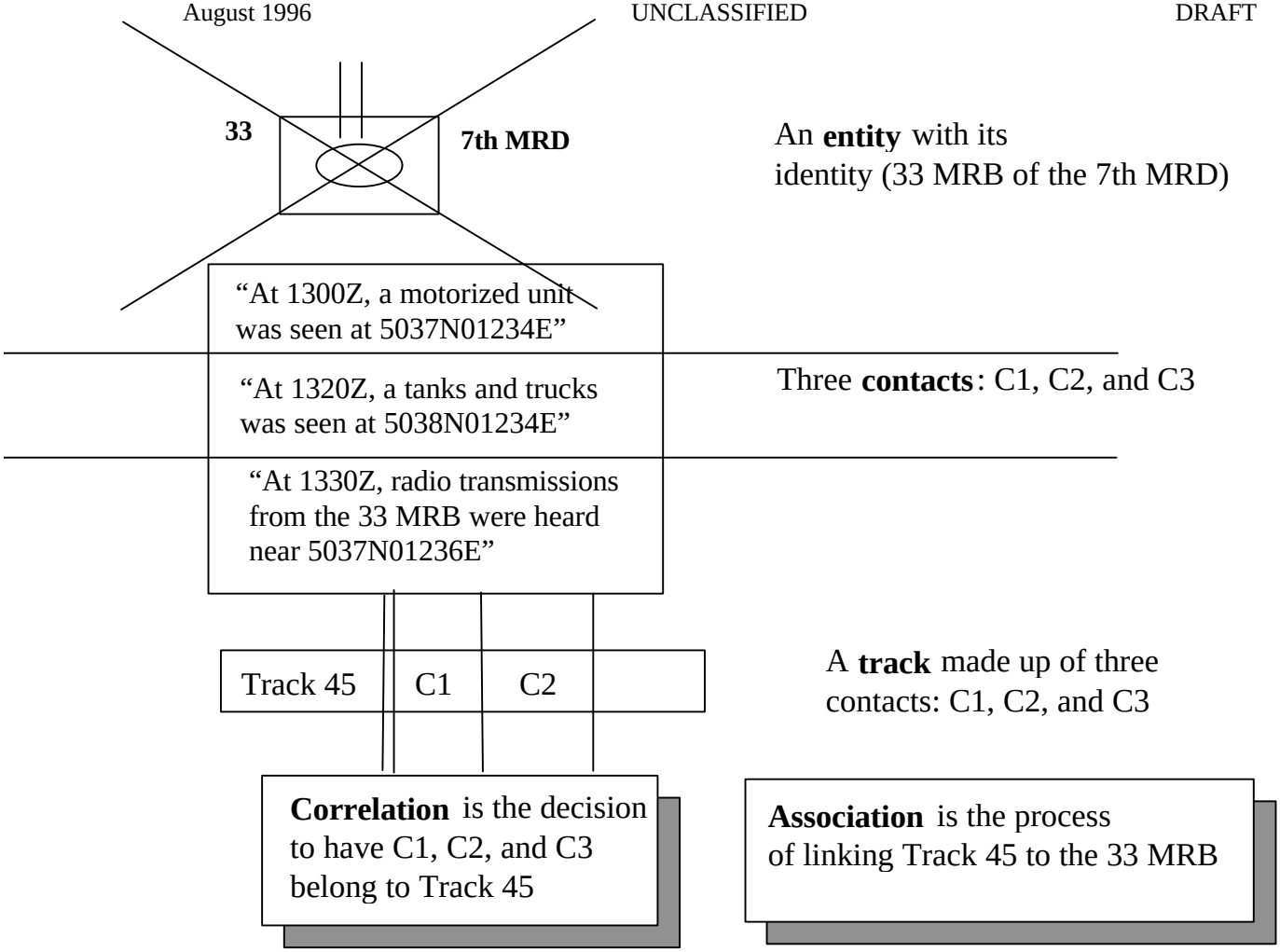

Figure 1. Track Correlation Concepts

1.2.3 Joint Mapping Tool Kit (JMTK) Services System Overview

This document includes the Mapping, Charting, Geodesy, and Imagery (MCG&I) functional area which is now commonly referred to as the Joint Mapping Tool Kit (GCCS/JMTK). The GCCS/JMTK is one of 19 functional components comprising the Global Command and Control System (GCCS) Common Operating Environment (COE) (See Figure 2. GCCS COE Architecture). The GCCS/JMTK is considered a common support application.

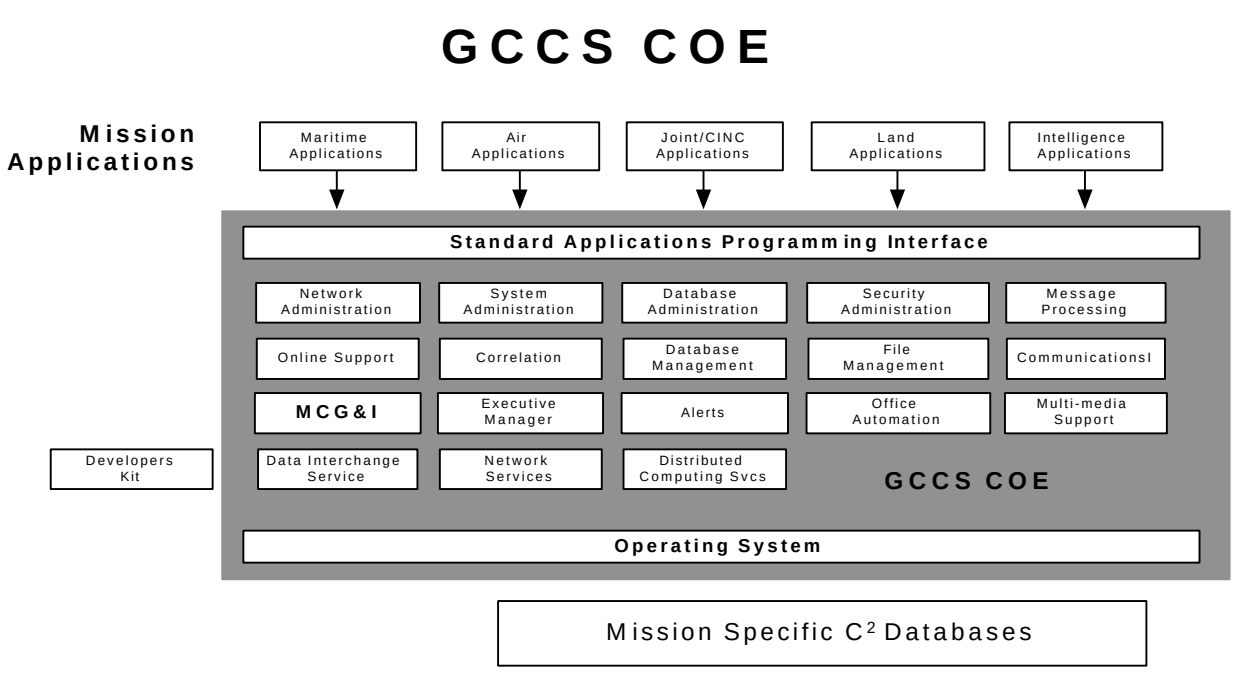

Figure 2. GCCS COE Architecture

GCCS/JMTK is a program sponsored by the Defense Mapping Agency (DMA) to integrate existing DoD software into a tool kit which will meet the mapping, charting, geodesy, and imagery (MCG&I) requirements of DISA's GCCS. The GCCS/JMTK will provide standard MCG&I data and exploitation capabilities as a functional area for the GCCS COE. DMA's implementation strategy is primarily based upon evolutionary migration. Because each of the three military services has software products that perform identical functions, the GCCS approach was to use the best of each and integrate these components into the 3.0 delivery of GCCS/JMTK. Figure 3. GCCS/JMTK Architecture 3.0 shows the GCCS/JMTK 3.0 Architecture.

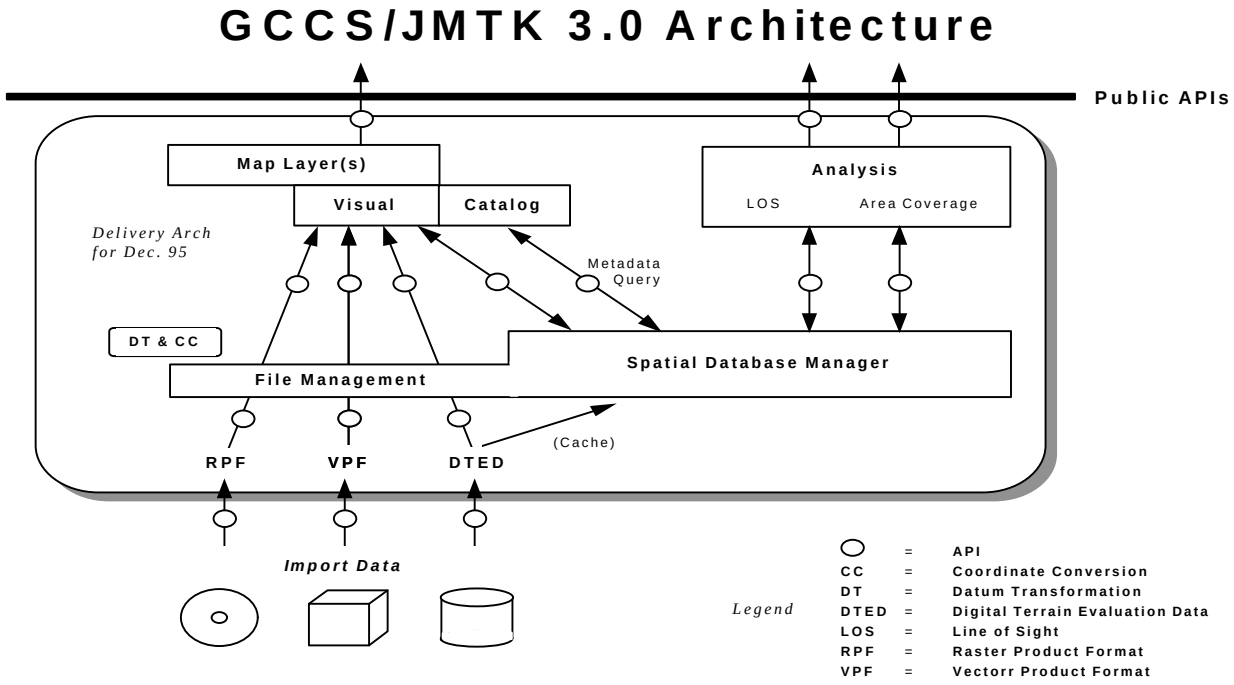

Figure 3. GCCS/JMTK Architecture 3.0

In subsequent releases, the GCCS/JMTK will migrate from a constrained approach dictated by its initial reliance on the software contributions of the individual services, to an independent architecture that is objective and in compliance with the DII COE. Figure 4 shows the proposed GCCS/JMTK Design for GCCS Release 4.0.

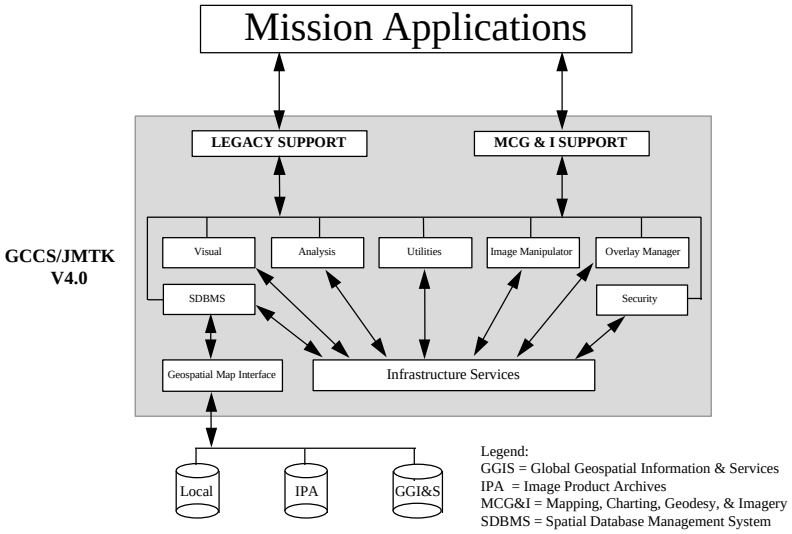

Figure 4. Proposed GCCS/JMTK Version 4.0 Architecture

GCCS/JMTK is an integration effort sponsored by the Defense Mapping Agency (DMA) to integrate existing Department of Defense (DoD) software into a tool kit which will meet the requirements of the GCCS COE. The GCCS/JMTK will provide standard mapping, charting, geodesy, and imagery data and exploitation capabilities as a functional area for the GCCS COE. The GCCS/JMTK architecture (Figure 5. Schematic of GCCS/JMTK, Version 3.0) consists of three blocks: Block 1 - visual (display of maps and overlays), Block 2 - analysis (e.g., terrain analysis, line of sight), and Block 3 - spatial database (of DMA products and other products produced by the military services as well as files generated by GCCS/JMTK). Interconnection of the three major components is through Application Programming Interfaces (APIs).

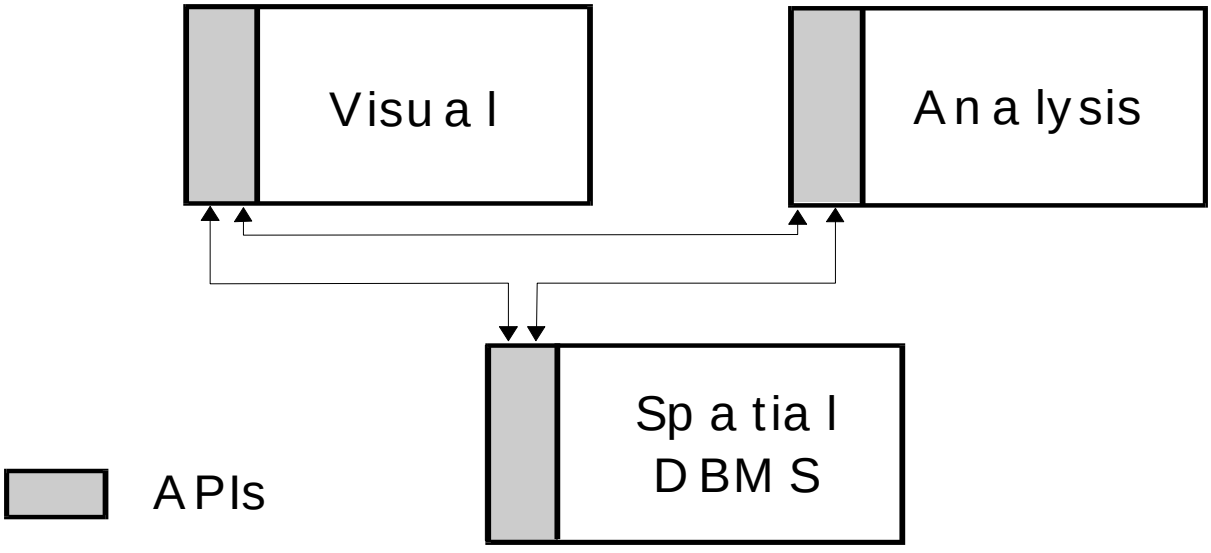

Figure 5. Schematic of GCCS/JMTK, Version 3.0

DMA's implementation strategy is primarily based upon evolutionary migration. The visual block will be taken from the Navy product - CHART; the analysis block will be taken from the Army product - Terrain Evaluation Model (TEM), and the spatial database will be taken from the Air Force product - Common Mapping Tool Kit (CMTK). Because each of the three military services has software products that perform identical functions, the GCCS approach is to use the best of each and integrate these components into GCCS/JMTK.

The GCCS/JMTK will ultimately be employed by users of GCCS. GCCS will become the single Command, Control, Communications, Computer, and Intelligence (C^4I) system to support the warfighter at the command post and eventually in the cockpit and in the foxhole. The GCCS will provide a single view for the joint warfighter. The view will be through a widely distributed, user driven network to which the warfighter "plugs-in".

1.2.4 Message Processing Services System Overview

This document includes the software requirements for the Global Command and Control System (GCCS) Common Operating Environment (COE) message processing functional area. The purpose of the message processing functional area is to provide message receipt, routing, storage, retrieval, parsing, generation, coordination, release and processing of standing request for information.

The message processing module is logically bounded on one side by the communications module and on the other side by supported processes and/or other COE modules. Processing of inbound messages from the communications front end includes such essential functions as validation, profiling, standing request for information, parsing, and routing. Processing of messages for hand off to the communications front end includes such essential functions as message preparation, validation, header preparation and coordination/release. The message processor is capable of processing both formatted and unformatted messages which are validated by tables derived from the Joint Interoperability Engineering Office (JIEO) Central Data Base System (CDBS). Message processor module components may be employed independently to perform a single or group of functions, such as construct message reports while another tool validates. Figure 6. Message Processing Module provides a top level functional flow of the message processing module and identifies three major subordinate areas within the processing module. Two of these areas are inbound and outbound processing which contain functionality specific to that process. The third is support services which contain functionality used by both inbound and outbound processing.

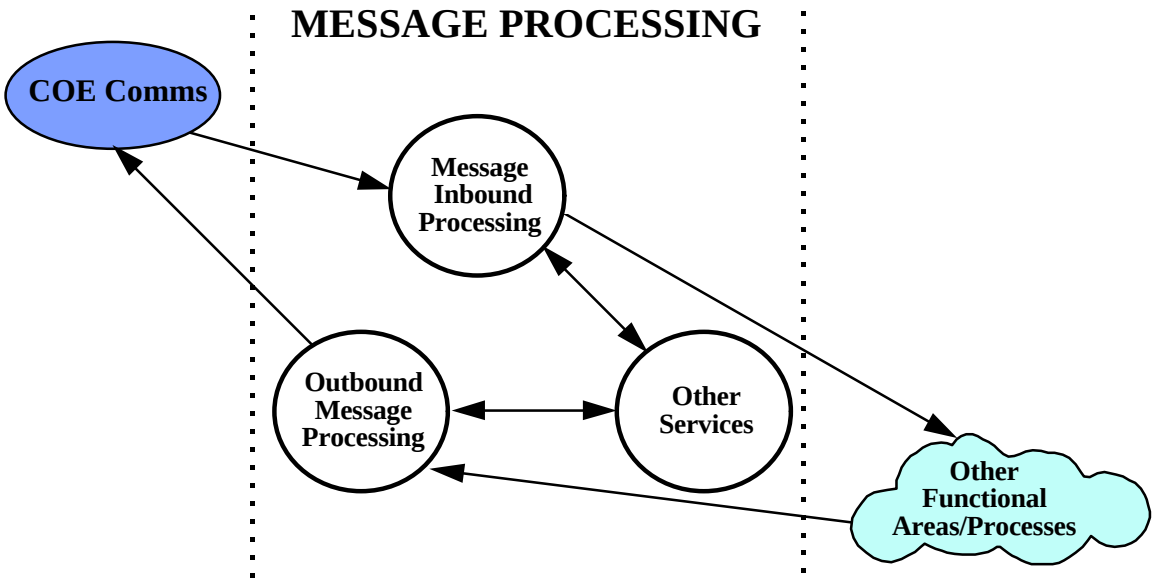

Figure 6. Message Processing Module

The message processing module provides for message receipt, from a communications front end; internal message routing; the generation, coordination and release of outbound messages; data normalization; storage and retrieval; message profiling; and format validation.

The message processing functional area consists of modularized and callable software that supports message parsing, message storage and retrieval, scanning of inbound messages for satisfaction of Standing Request for Information (SRI), internal routing of messages, message creation (automatically or interactively), data normalization, retrospective search, and error handling. It is a generic, table driven processor that accepts formatted and unformatted USMTF like messages from a communications front end, validates message format and field content, then performs additional processing as directed by the user. Figure 7. Message Processing Module Functional Flow Diagram provides a functional flow of the message processing module.

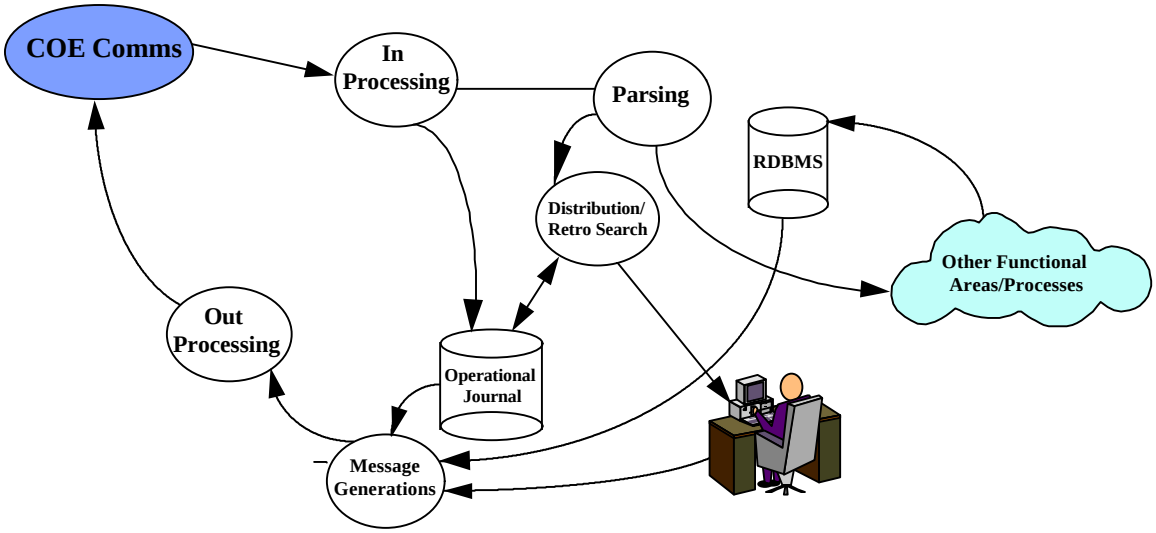

Figure 7. Message Processing Module Functional Flow Diagram

1.2.5 Office Automation Services System Overview

This document includes the Office Automation requirements for the Defense Information Infrastructure (DII). Dependencies and interactions between Office Automation and other functional areas of DII are discussed to help clarify where Office Automation begins and ends and how these services fit into the overall DII Common Operating Environment (COE).

The Office Automation (OA) requirements identify standards for interoperability and data interchange for the OA software packages. Emphasis is placed on the identification of standard data protocols and data formats, leaving users to select compliant, Word Processing, Spreadsheet and Briefing Graphics packages that best meet their needs. The goal is to establish applications that communicate through standard Application Programming Interfaces (APIs). The office automation requirements contained within this document shall be used throughout the other DII functional areas to perform similar functions.

Requirements in this document pertain to software developed for the DII, software developed by other programs which have been contributed to DII, and, where possible, to non-developmental software (Government-Off-The Shelf (GOTS) and Commercial-Off-The-Shelf (COTS)) which have been licensed for use within DII.

Office Automation is part of the DII COE. OA identifies standards for the DII OA software packages. The OA software packages will provide general automated productivity-enhancing applications. The office automation functional capabilities include: word processing, email, presentation graphics, spreadsheet, drawing, illustration, and other office tools identified as necessary within the DII COE.

Word Processor applications support the writing, revising, manipulation, formatting, and printing of electronic documents, printed papers, printed reports, and other printed matter. Word Processor applications also support limited functions for document formatting, e.g., changes of font, line spacing, incorporation of graphics created with another application, or page layout.

Electronic Mail applications support the creation, sending, receiving, viewing, storing, and forwarding of digital information. The information may be text, video, sound, imagery, graphics, animation, multimedia or hypermedia. Capabilities such as forward, carbon copies, return request receipts, electronic signature authentication, and the ability to attach files are supported. Electronic Mail applications let users specify parameters for what information to discard or retain and how it should be stored. Electronic Mail messages should not be confused with the Message Processing System "formatted messages"; however, the two systems should be interoperable at the protocol level and be capable of exchanging data, e.g., messages and message attachments.

Presentation Graphics applications support the planning, writing, revising, manipulation, formatting, and printing of briefings. The slides for a briefing are treated by Presentation Graphics applications as a single entity and not as a separate file for each image. Presentation Graphics applications include business graphics and tools for limited drawing and painting tasks. Images and graphics created by other office automation applications may be inserted into the Presentation Graphics images.

Spreadsheet applications support the processing of information that is arranged in rectangular arrays. Spreadsheet applications use rows and columns of cells. Each cell can hold text or numerical data, or a formula that uses values in another cell to calculate a result. Spreadsheet applications also support the graphical display (e.g., scatter grams, two and three dimensional graphs) of the data contained in the spreadsheet.

Drawing and Illustration applications support the creation and manipulation of object-oriented graphics (e.g., lines, curves, and other geometric shapes). A user of Drawing applications can manipulate an element such as a line, circle, or block of text as an independent object by selecting the object and moving it.

1.2.6 On-Line Support Services System Overview

Due to the complexity of software, it is often unreasonable to assume users will be capable of learning the operation of an entire package. To resolve this issue within the GCCS COE, On-Line Support must be made available to aid operators of the system. The On-Line Support functional area will serve as the main vehicle to provide all users with the necessary assistance in all aspects of system operation. Four basic support services are required to achieve comprehensive coverage of system operation: On-Line Help, On-Line Job Planning, On-Line Reference, and Computer Based Instruction (CBI).

The On-Line Help service is intended to provide quick reference help as needed by the user. It is a service available to users for purposes of completing a particular task which does not involve complex procedures.

The second service, Job Planning, is intended to assist users in identifying and understanding the processes involved in simple or complex task execution. This can be presented to the user in the form of flow charts illustrating step-by-step procedures complemented by detailed text descriptions of the events shown in the diagram.

On-Line Reference offers the user the ability to browse electronic versions of operator and system manuals to allow for a deeper understanding of the system should he/she feel the need or desire.

Finally, the purpose of CBI is to offer structured lessons or tutorials. CBI could, in theory, instruct the user in almost any subject matter, potentially circumventing accredited instruction programs at Navy Schools. Such problems, while significant, may be solved by establishing preventive procedures. This document does not define the subject matter of CBI; its purpose is to define CBI capabilities within the GCCS COE, without regard to content of the instruction.

1.3 Document Overview

Section 2 lists documents referenced and documents that provide guidance applicable to this specification.

Section 3 details the requirements for each of the DII COE common support application services: Alerts Services, Track Correlation Management Services, Joint Mapping Tool Kit (JMTK) Services, Message Processing Services, Office Automation Services, and On-Line Support Services.

Section 4 identifies the qualification provisions including the methods used to ensure that the requirements in Section 3 have been met.

Section 5 addresses the traceability of each requirement from an appropriate source, such as a requirements document; Section 5 also includes implementation priorities for each requirement.